REMARKS

Claims 15, 16, 18-22, and 24-28 are pending.

Rejection of claims under 35 USC § 102

Claims 21, 22, 24, 25, 27, and 28 are rejected under 35 U.S.C.§ 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Kaenel et al., Ballistic-electron-emission Spectroscopy, *App. Phys. A.* [Suppl.], S227-S232 (2001) / Digital Object Identifier (DOI) 10.1007/s003390100749 ("Kaenel"). Kaenel appears to describe the application of microscopy and spectroscopy techniques to analyze epitaxial heterostructures including (i) epitaxial $CoSi_2$/semiconductor interfaces on Si(111) and (ii) self-assembled Ge quantum dots on Si(100), buried in a Si matrix, and capped with epitaxial $CoSi_2$. *See* page S227, first column, last paragraph.

As recognized by the Examiner, Kaenel appears to describe a structure including backside $CoSi_2$/Si substrate/Si buffer/Ge dots/ $CoSi_2$/Si cap. *See* page S227, column 2, second paragraph. But a plurality of Ge quantum dots in a Si matrix is not equivalent to a Ge layer, as recited in independent claim 21, as the compositions of the two material systems are different. Moreover, Ge dots capped with Si have a compressive strain. *See* Kolobov et al., Physical Review B 66, 075319 (2002), abstract (attached hereto as Appendix A). The stress engineering layer recited in independent claims 21, 27, and 28 increases a tensile strain of a Ge or Ge-containing layer. The material disclosed by Kaenel, therefore, is inherently different from the material recited in the instant claims.

Applicants submit that independent claims 21, 27, and 28 and claims dependent therefrom, are patentable over the cited prior art for at least these reasons.

Rejection of claims under 35 USC § 103

Claims 15, 16, 18, and 19 are rejected under 35 U.S.C. § 103(a) as being obvious over Kaenel in view of Kubler et al., "Si adatom surface migration biasing by elastic strain gradients during capping of Ge or $Si_{1-x}Ge$ hut islands" *Applied Physics Letters*, Volume 73, Number 8 (August 24, 1998) pages 1053-1055 ("Kubler"), or Sutter et al., "Embedding of nanoscale 3D SiGe islands in a Si matrix" *Physical Review Letters*, Volume 81, Number 16 (October 19, 1998) pages 3471-3474 ("Sutter"). The Examiner recognizes that Kaenel does not disclose a SiGe material and characterizes Kubler and Sutter as disclosing Ge and SiGe quantum dots embedded in a Si matrix. The Examiner argues it would have been obvious to replace the Ge quantum dots of Kaenel with the SiGe quantum dots to attain the structure of independent claim 15.

Claim 15, however, recites a SiGe layer disposed over a substrate. A plurality of SiGe quantum dots in a Si matrix, as disclosed by Sutter, is not equivalent to a SiGe layer. Moreover, Ge-Si dots capped with Si have a compressive strain. *See* Kolobov et al., Physical Review B 66, 075319 (2002), abstract (attached hereto as Appendix A). The stress engineering layer recited in independent claims 15 increases a tensile strain of a SiGe layer. The materials disclosed by Kaenel, Kubler, and Sutter, therefore, are inherently different from the material recited in the instant claims.

Applicants submit that independent claim 15 and claims dependent therefrom are patentable over the cited prior art for at least these reasons.

Dependent claims 20 and 26 are rejected as being obvious over Kaenel in combination with one or more of Kubler and Sutter, further in view of Seto et al. ("Si/SiGe resonant cavity photodiodes for optical storage applications" *Applied Physics Letters*, Volume 72, Number 13, (March 30 1998) pages 1550-1552. These two claims are also rejected over U.S. Patent No. 5,633,194 to Selvakumar et al. ("Selvakumar") in view of Kaenel, as evidenced by Meyer, further in view of Seto. Applicants submit that these dependent claims are patentable for at least the reasons that independent claims 15 and 21, upon which they depend, are patentable.

Claims 15, 16, 18, 19, 21, 22, 24, 25, 27, and 28 are rejected as being unpatentable over Selvakumar in view of Kaenel as evidenced by Meyer et al., "Electron and hole focusing in $SoSi_2$/Si(111) observed by electron emission microscopy," *Physical Review Letters*, Volume 85, Number 7 (August 14, 2000) pages 1520-1523 ("Meyer"). Selvakumar appears to disclose utilizing ion beams to epitaxially grow SiGe, Si, or Ge on Si substrates. *See* column 1, lines 39-41. Al may be deposited on the backside to complete the formation of a diode by forming a backside ohmic contact. *See* column 3, lines 12-15 and column 4, lines 40-45.

The Examiner recognizes that Selvakumar does not disclose forming a silicide, i.e., an exemplary stress engineering layer as required by independent claim 15, on the backside of the wafers, and relies on Kaenel and Meyer to provide this feature. In particular, the Examiner notes that Kaenel teaches a diode structure that includes a $CoSi_2$ film deposited on the backside of a silicon substrate. The Examiner states that Kaenel does not refer to the backside $CoSi_2$ layer as an ohmic backside contact, but reasons that further work by Kaenel evidences that the backside layer disclosed by Kaenel is an ohmic contact. For support, the Examiner notes that Meyer discloses forming an ohmic contact by depositing $CoSi_2$ on the backside of a wafer. *See* page 1520, second column, last paragraph. The Examiner concludes by stating that it would have been obvious to one of skill in the art to substitute the aluminum backside ohmic contact of Selvakumar with a $CoSi_2$ backside contact taught by Kaenel as these backside contacts have been shown to be functionally equivalent backside ohmic contacts for forming heterojunction diodes.

The Examiner, however, has not presented any evidence that Al and $CoSi_2$ backside ohmic contacts are functionally equivalent, and hence has not demonstrated that one of skill in the art would substitute the Al backside layer of the diodes disclosed by Selvakumar with the $CoSi_2$ backside layer of the quantum dot heterostructures disclosed by Kaenel and the $CoSi_2$/Si structures of Meyer. In addition, none of these references discloses a stress engineering layer that increases a tensile strain of a layer disposed on an opposite side of a substrate, as recited in the instant claims.

Applicants submit that independent claim 15, 21, 27, and 28 and claims dependent therefrom are patentable over the cited prior art for at least these reasons.

CONCLUSION

In light of the foregoing, Applicant respectfully requests reconsideration and withdrawal of all grounds of rejections, and allowance of all pending claims in due course.

No fees are believed necessary for filing this Response. However, if any fees are due, the Director is hereby authorized to charge such fees to our Deposit Account No. 07-1700, under Order No. MIT-166.

If the Examiner believes that a telephone conversation with Applicants' attorney would expedite allowance of this application, the Examiner is cordially invited to call the undersigned attorney at (617) 570-1806.

Respectfully submitted,

Date: January 12, 2011
Reg. No. 44,381

/Natasha C. Us/
Natasha C. Us
Attorney for Applicants
Goodwin Procter LLP
Exchange Place
Boston, Massachusetts 02109

Tel. No.: (617) 570-1806
Fax No.: (617) 523-1231

LIBC/3966845.1